



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,750	02/09/2002	Grant M. Ehrlich	D-176-1	6093
7590	04/05/2004		EXAMINER	
John R. Doherty P.O. Box 706 Stevenson, CT 06491-0706			DOVE, TRACY MAE	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 04/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/073,750

Applicant(s)

EHRlich ET AL.

Examiner

Tracy Dove

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-17 is/are pending in the application.
- 4a) Of the above claim(s) 10-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group II, claims 14-17 filed 1/7/04 is acknowledged. The traversal is on the ground(s) that a search for all claims would involve a search of the same extent and breath. This is not found persuasive because a method for coating a substrate (claims 10-13) requires a search in class 427. Group II, claims 14-17, does not require a search in class 427 because the claims are not directed toward a method. Claims 10-13 are withdrawn from further consideration as being drawn to a nonelected invention.

The requirement is still deemed proper and is therefore made FINAL.

Claim Objections

Claim 14 is objected to because of the following informalities: the claim recites “poly(phosphazine) *and* poly(methylmethacrylate) polymers *and* mixtures thereof”, which is not proper Markush group language because the group should be closed by a single “and”. Examiner suggests “poly(phosphazine), poly(methylmethacrylate) polymers and mixtures thereof”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 14-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase “substantially uniformly dispersed” renders claim 14 indefinite. While the term “substantially” may be definite in view of the general guidelines contained in the specification, in this case, the specification fails to provide a definition for what is meant by “substantially uniformly dispersed” in claim 14. Namely, how large of a concentration gradient, localized or across the sample, may the powdered coating material exhibit and still be considered substantially uniformly dispersed. For the purpose of examination, any composition wherein the concentration of a powdered material does not explicitly vary throughout the sample is taken to be substantially uniformly dispersed.

Claims Analysis

The phrase “a bonding promoter” is described in the specification as a crosslinking agent (page 4-5). The specific compounds recited in claim 14 are termed “cross-linking agents” on page 8 of the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshimura et al., US 4,482,476.

Yoshimura teaches a fluoroelastomer-containing electrically conductive coating composition comprising a fluoroelastomer, a fluororesin, a coupling agent and an electrically conductive material (abstract). The coating composition is used for coating various kinds of

Art Unit: 1745

substrates such as metals, plastics, rubbers, glass, ceramics and fabrics (1:15-20). The fluoroelastomer is preferably vinylidene fluoride/hexafluoropropylene copolymer (2:24-28). The coupling agent is preferably a silane coupling agent (2:66-67). Particularly preferred are aminosilane compounds. The silane coupling agent may be represented by the formula (I) in column 3, lines 1-14. Preferred examples of silane coupling agents are N- β -aminoethyl- γ -aminopropyltrimethoxysilane and N-(trimethoxysilyl-propyl)ethylenediamine. These two compounds are most preferred since they not only serve as a vulcanizing agent of the fluoroelastomer but also improve the adhesivity of the coating film to the substrate (3:21-38). The electrically conducting material may be a conventional one such as carbon, graphite, metals or an antistatic agent (4:23-31). The coating composition is applied onto the substrate and cured. The coated film has excellent adhesivity to the substrate and good mechanical properties, particularly tensile strength (5:37-54). The coating composition of Yoshimura may be applied to various electrical components such as an electrode (5:55-6:12).

Thus the claims are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al., US 5,565,284 in view of Yoshimura et al., US 4,482,476.

Art Unit: 1745

Koga teaches a lithium secondary cell having a negative and/or positive electrode material bonded to a current collector surface by a binder containing a crosslinked polymer or formed by coating to a current collector a composition comprising an active material and a polymer binder containing a fluorinated polymer which is curable upon exposure to radiation, followed by radiation curing treatment (abstract). The object of Koga is to prevent the positive and/or negative electrode materials from shedding from the current collector (improve adhesion between coating and collector). A binder containing a crosslinked polymer is used for securing to a current collector surface a coating of carbon powder or layer lattice compound powder used as an active material for positive and negative electrodes of a lithium secondary cell (3:14-18). The layer lattice compound is preferably selected from composite oxides containing lithium (5:14-18). Vinylidene fluoride-propylene hexafluoride copolymer may be used as the polymer that is crosslinked (5:43-44). Polyvinylidene fluoride may be used as the polymer that is crosslinked (6:6). The binder may further contain another polymer such as polymethyl methacrylate (6:30-35). See also column 7, lines 20-52. The electrode may be prepared by mixing and dispersing the active material, binder polymer(s), crosslinking agent, radiation curable compound and various additives optionally with a solvent in a dispersion device to thereby form an electrode coating composition (11:5-21). The binder may be silane-crosslinked polyvinylidene fluoride wherein the crosslinking agent is vinyltris(β -methoxyethoxy)silane (13:30-38).

Koga does not teach the specific bonding promoters (crosslinking agent) of the claimed invention.

However, Yoshimura teaches a fluoroelastomer-containing electrically conductive coating composition comprising a fluoroelastomer, a fluororesin, a coupling agent (crosslinking agent) and an electrically conductive material (abstract). The coating composition is used for coating various kinds of substrates such as metals, plastics, rubbers, glass, ceramics and fabrics (1:15-20). The fluoroelastomer is preferably vinylidene fluoride/hexafluoropropylene copolymer (2:24-28). The coupling agent is preferably a silane coupling agent (2:66-67). Particularly preferred are aminosilane compounds. The silane coupling agent may be represented by the formula (I) in column 3, lines 1-14. Preferred examples of silane coupling agents are N- β -aminoethyl- γ -aminopropyltrimethoxysilane and N-(trimethoxysilyl-propyl)ethylenediamine. These two compounds are most preferred since they not only serve as a vulcanizing agent of the fluoroelastomer but also improve the adhesivity of the coating film to the substrate (3:21-38). The electrically conducting material may be a conventional one such as carbon, graphite, metals or an antistatic agent (4:23-31). The coating composition is applied onto the substrate and cured. The coated film has excellent adhesivity to the substrate and good mechanical properties, particularly tensile strength (5:37-54). The coating composition of Yoshimura may be applied to various electrical components such as an electrode (5:55-6:12).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have known that any known silane crosslinking agent for fluorine containing polymers could be used for the crosslinking agent of Koga. Yoshimura represents the coupling agent by the formula $R^1SiR^2_3$ wherein R^2 and R^3 may be a C1 to C10 alkoxy and R^1 may be N-(2 aminoethyl)-3-aminopropyl (3:3-20). If R^2 and R^3 are chosen as ethoxy groups, the resulting coupling agent

would be N-(2-aminoethyl)-3-aminopropyl-triethoxysilane. Preferred examples of silane coupling agents are N- β -aminoethyl- γ -aminopropyltrimethoxysilane and N-(trimethoxysilyl-propyl)ethylenediamine. It would have been obvious to use any of the possible coupling agent given the reasonable expectation of equivalent results and absent a showing of criticality. One of skill in the art would have been motivated to combine the teaching of Koga and Yoshimura because both reference are directed toward improving the adhesion between a coating composition and a metal substrate by using a cross linked fluoropolymer such as polyvinylidene fluoride or polyvinylidene fluoride-hexafluoropropylene in the coating composition.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Keller et al., US 5,891,593, teaches electrode materials suitable for lithium-ion electrochemical cells. The electrode includes a binder that may have a silane group introduced into the binder (3:40-45).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Tracy Dove", with a stylized, flowing script.

Tracy Dove
Patent Examiner
Technology Center 1700
Art Unit 1745

March 26, 2004